

BACKGROUND OF THE INVENTION

Material-handling devices that are powered-units capable of loading and unloading freight from a truck have been utilized for years. The backbone beam dolly is much more cost-effective and can travel with the truck over vast distances without substantially increasing the weight of the loaded truck.

SUMMARY OF THE INVENTION

I have discovered that a beam can be constructed in a manner which makes it possible to add or remove interchangeable wheel assemblies, outriggers and lifting cranes.

This makes it possible to utilize a backbone beam unit that has a very high strength-to-weight ratio to load and unload large loads from a truck without the use of an expensive separately powered lifting crane.

The backbone beam dolly is towable by one man. A pallet jack may be used at one end in place of a wheel assembly. The dolly with an outrigger can pick-up large loads and transport them over significant distances.

The backbone beam dolly provides a highly cost effective material-handling device which can be carried in a truck. Since the backbone beam dolly is a very lightweight device it does not greatly reduce the payload capacity of the truck.

The specific nature of the invention, as well as other objects, uses, and advantages, thereof, will clearly appear from the following description and from the accompanying drawings. Drawings are not to the same scale.

[illegible]

Figure 1

Elevation view of the backbone beam dolly.

Figure 2

Sectional view of the backbone beam dolly longitudinal centerline.

Figure 3

Front view of narrow wheel base wheel assembly with swivel casters.

Figure 4

Front view of wide wheel base wheel assembly non-swivel casters.

Figure 5

Perspective view of four-wheeler dolly with receiver for coupling mechanism for single and dual unit coupling.

Figure 6

Front view of single four-wheeler dolly unit coupling mechanism.

Figure 7

Front view of dual unit coupling mechanism.

Figure 8

Perspective view of backbone beam dolly with two units of four-wheeler dollies providing the wheel assembly support for one end.

Figure 9

Perspective view of the backbone beam dolly with outrigger and lifting arm.

Figure 10

Side view of backbone beam dolly with pallet jack in front of wheel assembly position.

Figure 11

Pallet jack coupler.

Figure 12

Crane beam assembly.

Figure 13

End view of female receiver of crane beam.

Figure 14

Top view of crane beam.

Figure 15

Ground engaging feet.

Figure 16

Side view backbone beam dolly being hoisted up by ratchet attached to truck.

Figure 17

Side view landing gear jack being cranked down to stabilize the backbone beam dolly.

Figure 18

Cut away view. Backbone beam dolly held in place under truck bed. Ground engaging feet hold both ends of dolly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Backbone beam dolly material-handling device 10 is shown in Figure 1. The horizontal disposed frame comprises longitudinal frame members 11, cross members 18, and wheel assemblies 12. In the preferred embodiment, the longitudinal frame members and cross members are rigid structures of steel or aluminum. The longitudinal member is a channel shape structure with holes which allow cross members 18 to project through and be welded. The cross members are hollow tubes that form tunnels through which straps can pass to secure the load.

The backbone beam dolly is a multipurpose material-handling device 10 which receives interchangeable wheel assemblies 12. Wheel assemblies 12 are within the structure male insert 16 that fits into receiver 20 and is kept in place by means of a coupling pin. The backbone beam dolly 10 works extremely well with a wheel assembly 12 that contains a pair of swivel casters 30 and another wheel assembly with a pair of non-swivel casters 32. The backbone beam dolly can be pulled manually or towed with a lightweight vehicle.

Another version of usage of the backbone beam dolly is configured when the wheel assembly 12 or 14 is replaced with a pallet jack coupler 62 and a pallet jack 60 is put into place as shown in Figure 10. The pallet jack 60 can be used to tow the backbone beam dolly 10. Either a manual or an electrically powered pallet jack can be used. The pallet jack coupler 62 is inserted and secured into pallet jack coupler receiver 22. The pallet jack coupler 62 can rotationally swivel about the vertical axis extending through a longitudinal centerline of the backbone beam dolly. By using a pallet jack in conjunction with the backbone beam dolly, the combination of the dolly and the load can be stopped by lowering the pallet jack 60 and allowing the pallet jack coupler 62 to engage the ground. A load much longer and heavier can be transported with a pallet jack and backbone beam dolly combination than would be possible by using the pallet jack as a single unit.

Two four-wheeler dollies can be mated to the front end of a backbone beam dolly using a dual four-wheeler dolly coupler 38 shown in Figure 7. This dual unit configuration is shown in Figure 8. The wide spacing of the four-wheeler dollies

provided by coupler 38 gives good protection against a load with a high center of gravity falling over.

Another useful version of configuring the backbone beam dolly is to replace wheel assembly 12 with one four-wheel dolly 40. The single four-wheeler coupler 36 shown in Figure 6 can be rigidly attached to the four-wheeler dolly 40 shown in Figure 5. This is done by inserting male element 46 into receiver 42 and simultaneously inserting pin element 48 into hole 44 of the four-wheeler dolly and using a lynch pin to secure the configuration. This version of the backbone beam dolly works well where space is limited. The backbone beam can be carried without the need for wheel assemblies. The four-wheeler dollies are available to work as solo units when not in use as part of a backbone beam dolly configuration.

Figure 2 shows a sectional view of the backbone beam dolly with two wheel assemblies.

One of the wheel assemblies 12 has swivel casters 30 and the other wheel assembly has non-swivel casters 32.

Figure 3 shows a narrow wheel base wheel assembly with swivel casters 30. Figure 4 shows a wide wheel base wheel assembly with non-swivel casters 32.

Figure 5 shows a four-wheel horizontally disposed dolly 40 with a receiver 42.

Figure 6 shows a single four-wheeler dolly coupling unit 36 and Figure 7 shows a dual four-wheeler dolly coupling unit 38.

The dual dolly coupling unit 38 is shown affixed to the backbone beam dolly 10 in Figure 8. This arrangement of using two four-wheeler dollies provides a wide wheel base and makes it possible to transport loads with a center of gravity which is a significant distance from the longitudinal axis of the backbone beam dolly.

Figure 9 shows a backbone beam dolly 10 with a crane 72 inserted at the other end. The end of the backbone beam dolly opposite the crane has an outrigger arm 70. This arrangement makes it possible to pick up the load 71 using a hoist 75 extended from rotationally hinged arm 73.

Figure 10 shows a backbone beam dolly 10 fitted with a pallet jack coupler 62. This allows the pallet jack 60 to be used to lift the backbone beam dolly and transport loads.

Figure 11 shows a pallet jack coupler 62 with pallet jack fork receiver.

Figure 12 shows the construction of the crane assembly 72. Cross member tubes 74 are welded to cross member elements 52.

Figure 13 and 14 show the cross members 74 that go into the crane beam assembly 72.

Figure 14 shows the placement of the corners on 78.

Figure 16 shows a truck 94 with an extendable trailer landing gear 96. The backbone beam dolly is fitted with ground engaging feet mechanisms 86 shown in Figure 15. Adjustable ground engaging feet 92 extend from the unit and engage the ground. The ratchet strap assembly number 98 shown in Figure 17 is used to hoist the wheel assembly 12 until it is well clear of the ground. The ground engaging feet 92 are extended and tension on the ratchet strap assembly is removed. Cranking handle 90 is used to extend the trailer landing gear leg. 96. The weight of the truck 96 is applied to the backbone.

Figure 18 shows the backbone beam dolly with ground engaging feet. The backbone beam dolly is stabilized by vertical downward force from the trailer landing gear dolly 96. A crane assembly is in place to load freight onto or unload freight from the bed of the truck.

As an aid to correlating the terms of the claims to the exemplary drawing, the following catalog of elements is provided:

- 10 Backbone beam dolly
- 11 Frame members
- 12 Wheel assembly
- 14 Wide spread wheel assembly
- 16 Male insert
- 18 Cross members
- 20 Receivers
- 22 Pallet jack coupler receiver

24	Load carrier unit
30	Swivel casters
32	Non-swivel casters
36	Single four-wheeler coupler
38	Dual dolly coupler
40	Four-wheeler dolly
42	Receiver for coupling unit
44	Coupling hole
48	Pin element
52	Cross member elements
60	Pallet jack
62	Pallet jack coupler
64	Pallet jack fork receiver
70	Outrigger arm
71	Load
72	Crane assembly
73	Rotationally hinged arm
74	Cross member tubes
75	Hoist
76	Crane beam insert
78	Longitudinal corner units
84	Hoisting arms
85	Ground engaging feet mechanisms
88	Male insert
90	Cranking handle

- 92 Adjustable ground engaging feet
- 94 Trailer
- 96 Extendable trailer landing gear
- 98 Ratchet strap

The embodiment shown and described above is only exemplary. I do not claim to have invented all the parts, elements or steps described. Various modifications can be made in the construction, material, arrangement, and operation, and still be within the scope of my invention. The limits of the invention and the bounds of the patent protection are measured by and defined in the following claims. The restrictive description and drawing of the specific example above do not point out what an infringement of this patent would be, but are to enable the reader to make and use the invention as follows:

The invention is therefore claimed as follows:

1. A material-handling unit with a frame which comprises a horizontally disposed structure with a plurality of longitudinal members, a plurality of cross-frame members, and a plurality of receivers where said receivers can quickly receive and rigidly affix
 - A. Wheel assemblies
 - B. Outriggers
 - C. Receiver for a pallet jack
 - D. A crane beam assembly
 - E. Load carriers.